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Micro-Teaching

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Micro-Teaching Effects on Standardized Test Preparation

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Abstract

This research topic explores the use of micro-teaching curriculum to increase content mastery of mathematical topics that pertain to California state assessment. The participants for the Capstone project include 28 fourth-grade students in a public elementary school located within California's Silicon Valley. The project consists of in-class teaching using micro-lesson plans that focus on re-teaching subjects that are relevant to the California Assessment of Student Performance and Progress testing. The project uses 2 tests given at the beginning and the end of a 2-week teaching period to show visual correlations between the curriculum and student's content mastery. In the final project findings, the student's appeared to comprehend course curriculum to a higher degree, which is shown through graphed data sets. In the future, this project could become informative in the creation of future content used to help students catch-up and keep-up with California's state testing standards.

Keywords: micro-teaching, micro-lesson, content

Micro-Teaching Effects on Standardized Test Preparation

Standardized testing came into existence following the 1983 release of the “A Nation at Risk” report (Johnson & Johnson, 2009). This report began a wave of government involvement in the teaching of American youth. The introduction of government-funded curriculum and standards needed to be tested to make sure the schools were educating their students properly and helping America get back on track. These testing strategies are still in use today in the form of the California Assessment of Student Performance and Progress, CAASPP. Student taking these exams suffer from high anxiety during the three-day long test taking conditions. Cizek (2001) found that “testing produces gripping anxiety in even the brightest students, and makes young children vomit or cry, or both” (p. 12). The teachers may also feel the burden standardized tests show the effectiveness of a teacher and where good class scores can give advantages and praise, low scores can cause extra learning activities or risks of losing their job (Popham, 2001). Standardized testing despite its downfalls allows for the growth of the country and it is within the government’s best interests to continue them.

What is Standardized Testing?

High-stakes standardized testing has been utilized in the school environments following the article, “A Nation at Risk”, which underlined aspects of how American schools were failing in the task of teaching their students (Gardner, 1983). Much of the teaching at the time was done not behind desks and in front of chalkboards, but instead in circles where teachers would sew, read and talk to students during the school day. “A Nation at Risk”, pushed the government into the schools to correct this problem. From then on, a strict curriculum was established with testing to spot low performance. These tests started to report performance levels and if students did poorly, they might have to repeat a grade. If the school had low scores for subsequent years, the

government could penalize the school or close it out-right. In 2002, the No Child Left Behind (NCLB) act was signed into law under the administration of President George W. Bush. Its goal was to allow for all students regardless of gender, race, economic status or English proficiency to have a fair and equal opportunity to achieve higher education. During NCLB, schools were required to test students in grades three through eight. The testing pulled focus away from the arts and sciences and instead focuses on the proficiency in math and reading. In December of 2015 a new education reform legislature was ratified, Every Student Succeeds Act (ESSA) held the states accountable for their schools low testing score. The bill ended the government intervening in low testing schools. The states would now have to provide “technical assistance” or intervene through privatization, firing of staff or closing the school. (Neill, 2016, p. 10) This accountability measure put more emphasis in reporting the cost of students and reporting data on the student body’s race, socioeconomical status, language and disability status. By using this data with the test scores, the state would now have to report the lower-ranking schools and intervene as they saw fit.

When teachers, students, school, or administration feel the effects of low scores on a test, the test becomes high stakes. Low scores can cause a teacher to be revised, fired or hinder future progression in the school site. The students may be required to meet for extracurricular tutoring or activities and may not graduate due to low scores. With the implementation of ESSA and Common Core, testing has stayed in place, states now hold the accountability and provide the pressure for low performing schools. Our government focuses on test scores to judge the fitness of the school. The student’s focus is on learning and graduating. The cost of testing in nearly \$1.7 Billion per year just for printing scantrons and testing packets (Ujifusa, 2012). The money

spent on testing could instead be moved onto helping teachers set up their classroom and create a fair and equal learning environment for students.

Micro-Teaching of Previous Knowledge

Micro-teaching focuses teaching simulation when creating the lesson plan, by working towards individual skills the teacher must implement to create a flowing and engaging lesson. These skills are the Introduction, Board usage, Clarification with examples and Question and monitoring skills (Iksan, Zakaria, & Daud, 2014). Each skill uses classroom involvement as the basis for evaluating the lesson plan. By combining all these skills, the teaching is done in a compacted twenty to forty-minute window instead of the traditional hour to hour and a half that is found in most public schools. With real-time evaluation on the concepts taught the teacher can maneuver and change the lesson based on the class's engagement and attentiveness to the lesson being taught.

The introduction of the lesson is paramount in micro-teaching. The teacher must arouse interest in the subject matter and create visual stimuli to hold attention for the entirety of the lesson. This can be done by gestures, speech patterns and using different senses to convey information that is relevant to the material being taught. The teacher then must explain the topic and develop a baseline understanding of the ideas, so the students may create questions about the learning. Following the introduction, the teacher must use the amenities the school has for them, such as chalkboard, whiteboard or projector to create the plan, information, and illustrations while in front of the class, this creates interest in the students as you create the lesson in front of them and helps focus the class on the lesson. After the board skill is complete, the teacher asks the students what they see, or understand following their senses and prior knowledge. This small questioning stage allows flow into the third skill of clarification, reinforcement and monitoring.

In this stage the teacher explains using examples that meld with the interests of the students to provide context in the real world to the lesson. The teacher may use various materials to increase student participation and help invigorate conversation of the subject with their peers. While the students converse, the teacher must monitor and reinforce good ideas within the classroom. The final skill set used in Micro-teaching is the questioning skill. During this time the teacher uses both the classes questions and their own to create encouragement and feedback within the classroom. The teacher must implement oral skills such as wait times, further explanation or question chaining to influence growth of understanding. Following the lesson, the teacher must reevaluate the lesson plan for further changes to influence further pupil learning.

Micro-Teaching for Fourth Grade Teaching

When using Micro-teaching in public schools one must think of a few factors to evaluate the change in teaching methodology. The first being the Ease of Implementation, when switching from the status quo of teaching longer lessons, to a smaller more conceptual idea of teaching thus interrupting the status quo, the ease of that new method must be evaluated. The second evaluation method to look at is the sustainability of the teaching style. The school may have a mandated curriculum or teaching guideline that might conflict with the structure of micro-teaching thus making it ineffective or unlawful. Finally, we must analyze the cost of micro-teaching. The cost can be broken down into both financial cost of money but also the time that is used or unused in this teaching method. By evaluating these options and adopting the thoughts of the stakeholders who may be for or against the option we can progress to the best implementation of micro-teaching in the public-school environment.

First let us explore the idea of using micro teaching lessons as the primary way of teaching for an entire school year. In Saban's (2013) research report following teacher's opinions

of micro-teaching methodology, he finds that “80% of teachers remark that there would be challenges for them to implement micro-teaching into their classrooms. As well as 8 of the 10 students also thought they might have problems” (p. 236). This is concerning as in both cases; 10 teachers and 10 students went to similar cases to understand the teaching method. As such implementation for a year does not pass on the ease factor. With the students saying they may have problems with this teaching style the sustainability of this option also fails. When the teachers were asked for suggestions regarding microteaching, Saban’s (2013) findings show one teacher saying, “first of all we must be willing to do this and arrange the necessary equipment and materials before the lecture” (p.238). This is a form of cost in both time and money, as the teacher who is creating the lesson must have the financial ability to buy the materials but also have the time to willing and able to implement the micro-teaching strategies. All in all, changing the teaching method to micro-teaching only would fail all aspects of evaluation.

Instead, say the teacher breaks students into groups and teaches micro-lessons intermittently through the week. Considering the report, *Model of Lesson Study Approach during Micro Teaching*, Breaking students into groups is part of the micro-teaching lesson model. (p. 256) In public grade schools many teachers create groups for projects so implementation of two to three micro lessons with already planned groups could be achieved. On page 257 of the report, the author goes into how a teacher would form the groups, “students divided into groups consisting of four students per group, each member of the group would discuss the teaching goal they set and among each group, roles would be set”. By changing teaching roles between students and allowing for them to teach each other based on knowledge learned in class, the sustainability of this option is also met. The last criterion for evaluation is the cost of implementation. If we explore the idea that time is money then micro-teaching is effective in

lowering costs, however with the extra supplies and materials needed to continuously teach lessons money may become an issue. As such micro-teaching lessons intermittently through the week is neither bad nor good and can be defined as neutral.

Pre-test Micro-lesson Cram

The final option to look at is a pre-test cram micro-teaching lesson. In this lesson, students would be broken up into groups and retaught the information pertinent to their success on the California Assessment of Student Performance and Progress tests (CAASPP). This teaching option can be evaluated as neutral on the ease of implementation criterion. The students would have to adapt quickly to the new teaching method and absorb and relearn knowledge that is needed for testing. The cost of the cram style micro-testing would be in the time it takes the students to become acclimated to the new teaching method and the money it takes to acquire the resources needed to use micro-teaching in the classroom. With the final evaluation being of the sustainability, the students would only be learning in quick lessons for a week or two prior to the CAASPP, thus sustainability would be unaffected by the rapid lesson progression.

Table 1

Options of Implementation

Options	Ease	Sustainability	Cost
Micro-Teaching Year	Hard to Implement Limited Resources	Students may have problems with new method	Extra time and monetary cost of resources
2-3 Week Micro-Teaching	Students may already be grouped	Smaller lessons Peer to Peer teaching Revisit old concepts	Extra cost in money for resources Less time
Pre-test Cram Micro-Teaching	Re-teaches Information Fast pace	1-2 weeks of intensive unit re-learning	Large monetary cost and time associated with students' knowledge

Two weeks, two to three per week Micro Teaching

Using the criteria above, designing lesson plans for two weeks with intermittent teaching could prove useful overall in testing and student reception. As such the creation of curriculum and lesson plans following a group designed micro teaching lesson study, will be used to help improve student's cognitive fitness prior to the testing period as well as increase student's perception of content learned through-out class. The community partner's school site has a stagnate to declining testing pass rate and is seeing the repercussions of low scores in the class and in the administration. By implementing the above micro-teaching strategy in which lessons will be taught ranging between 20 and 40 minutes in length two to three days for two weeks' time the school site may see a positive score on future testing.

Project

Following the 1983 release of the "A Nation at Risk" report (Johnson & Johnson, 2009), the government became invested in the knowledge retention and application of its students. To gauge this the inclusion of federally funded standardized testing became part of the yearly public-school procedures. Through the years the government has changed the ways these tests are taken and the content that they test on. Today, following the Every Student Succeeds Act (ESSA) testing is done on mathematics and English-language arts. The current tests put more emphasis in reporting the cost of students and data such as; race, socioeconomical status, language and disability status. By using this data, coupled with the test scores the state must report low-ranking schools and intervene to increase testing scores. The low scores can come at a cost to students and teachers alike. Teachers may be fired or hindered in future progression and

students may have to attend extra-curricular tutoring or activities to improve their content retention.

The project is focused on the increasing of content mastery through micro teaching strategies that help to revisit old topics and bringing in new content to increase testing scores. The micro lessons strategies revolve around small, 20 to 40 minute, lessons that start on previously taught curriculum and build on the knowledge quickly and effectively to increase overall content knowledge and work towards mastery. The project was carried out in a fourth-grade class for 2 weeks for 3 days each week in hopes that the students would be ready for the standardized testing taking place a week after the end of the project. The students were given 2 quizzes that followed the upcoming California Assessment of Student Performance and Progress (CAASPP) testing format. The quizzes were used for data gathering for control and final data sets for comparison.

Design

The community partner chosen for this project works in the San Jose area in a 4th grade class. The School's mission and vision is to create leaders of tomorrow by focusing on critical thinking and uniting the community under the banner of learning. This coupled with their drive to provide bi-lingual and multi-lingual ELA classes helps the site create community involvement with families. The School Accountability Report Card (SARC) shows a very high amount of socioeconomically disadvantaged students as well as English language learners. This high population has created a need for English language teachers and has forced some students out into regular classes to be taught with their peers. In the Community partner's classroom there is a total of three students who struggle to read, write and speak the English language. The school's

demographics are both equal in male and female population with a high number of Hispanics, Whites and Asians making up the student body.

The community partner has been seeing increased trouble with the California Assessment of Student Performance and Progress testing (CAASPP) and has agree to be a part of micro lesson teaching for increase knowledge on previously learned subject matter. As it stands the community partner's campus has shown test scores in the 60's over the last 2 years. By implementing micro lessons into the classroom, the student may be refreshed for the state tests and help boost the scores on the next CAASPP Test. In 2016 and 2017 the only ethnic group that placed into the significant range of learning were those in the White and Asian groups and in 2017 the passing groups both fell in percentage when compared to the previous year. The Community partner's campus prides themselves on their integration of students into classrooms through ELA courses however when looking at the ELA CAASPP scores we can see the highest scores belonged to the White groups. This shows most Hispanic students failing to achieve satisfactory on the state tests and keep up with their peers

The project focuses on the low-test scores that the SARC shows at the community partner's campus by increasing content mastery through short lessons that spark interest and cause higher understanding in students. The CAASPP testing takes place to make sure students are learning state required content as well as gauge the amount of content that the students are capturing. In the project, two quizzes are prepared for the students both using the same questions, so they may be compared to see a change in content knowledge after the 2-week teaching period is over. Each lesson was written to fit into a 30 to 40-minute time-frame. This create a fast-paced environment in which students will rethink old concepts while building on their knowledge in small amounts for increase content mastery. On the first class and introduction to the students

was given and an explanation of the scope of the project as well as quiz A. The following days of instruction worked around identifying words and connecting their meanings to mathematical equations in word problems. The second week focused on fractions and decimal numbers which was added to the word problems, so students learned further concepts in word problems. Testing for knowledge both prior and post teaching, the data can show an increase, decrease or no change in the understanding of content related to and testable on the CAASPP tests.

Implementation

The first instruction day was not until the Wednesday of the first week, Monday was spent on introduction of the project, answering questions and giving out of quiz A. The first lesson was taught to introduce mathematical language to the students and help them find the correct operation to use to solve a word problem. In this lesson the students broke up into 5 groups of 6 students the students were all given the worksheet shown in *Figure 1*.

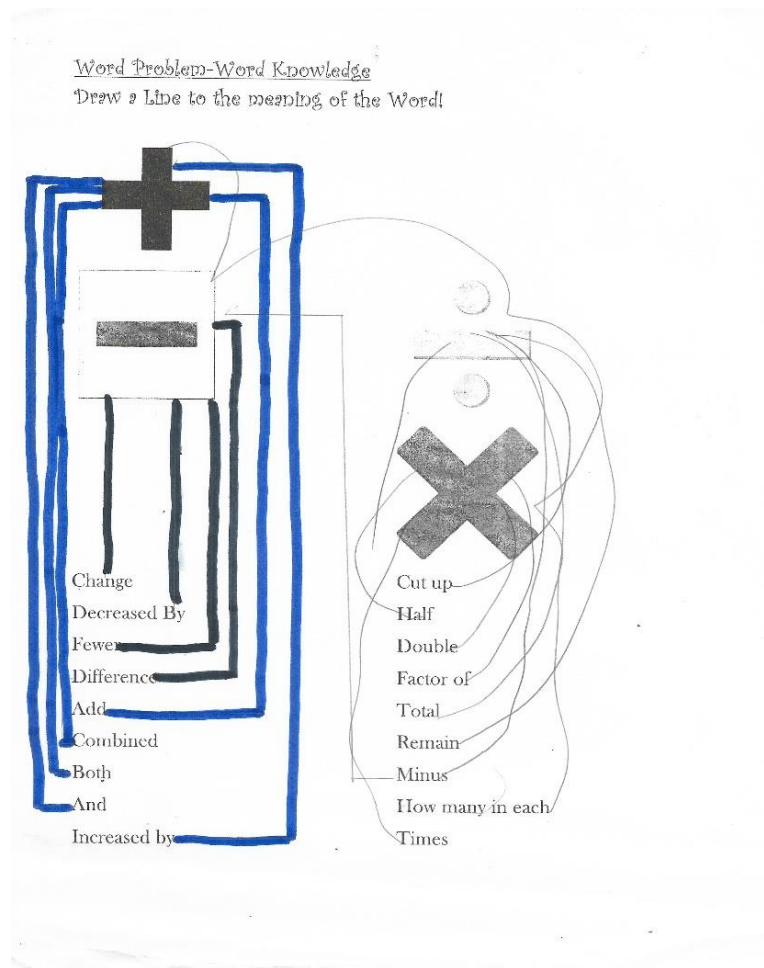


Figure 1. Mathematical language worksheet

This worksheet was worked on by a student and as described on the papers, the student drew lines from each word to their corresponding operation symbol. After this worksheet was completed, the students helped the teacher draw the correct paths to each symbol using an overhead projection on a white board. Using the mathematical language on these papers the students were then tasked to create a word problem that contained a mathematical word other than add or minus to flex their understanding of the words in context. *Figure 2.* and *Figure 3.* both show an example of student's written word problems on their whiteboard.

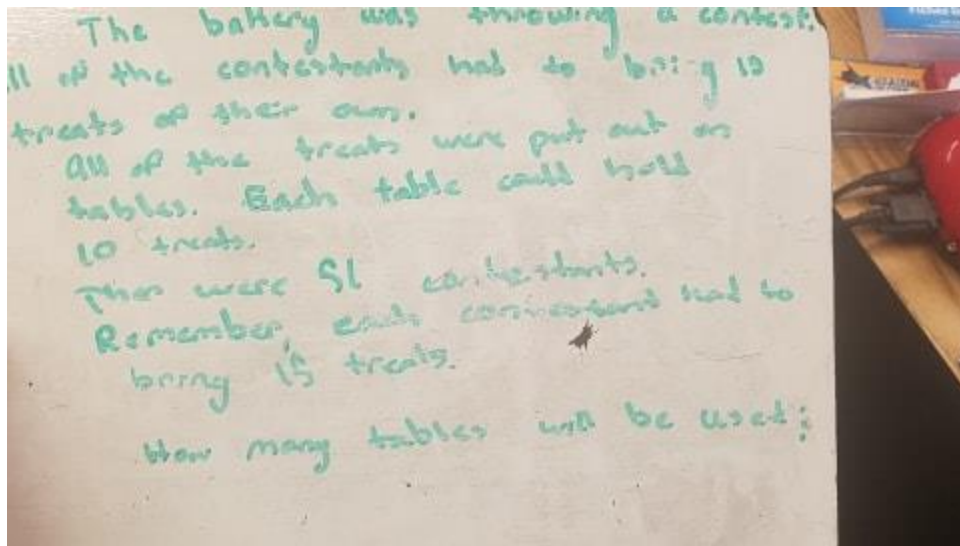


Figure 2. Group 1's word problem using mathematical language, community partner campus, March 7, 2019

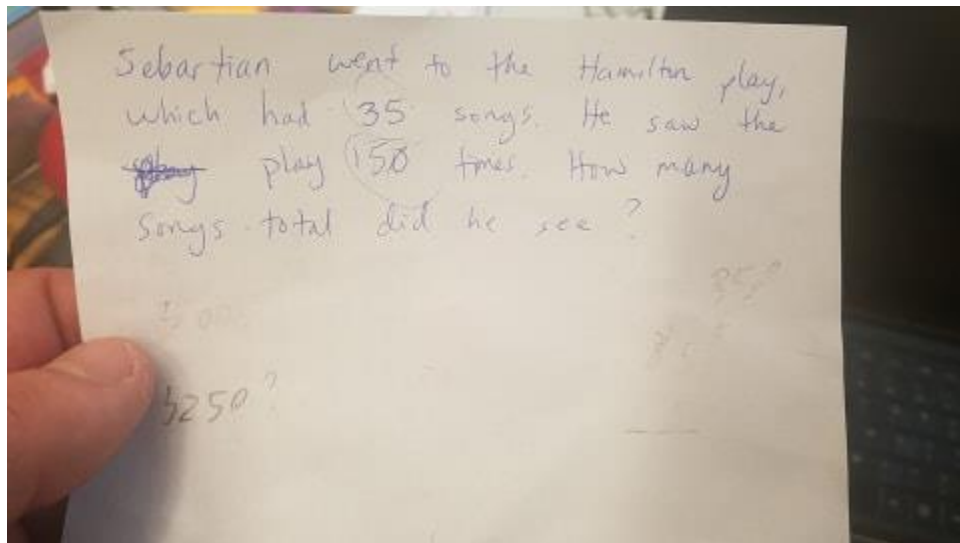


Figure 3. Group 2's word problem using mathematical language, community partner campus, March 7, 2019

The students then switched whiteboards with their peers and attempted to solve their peer's problems. During this activity the community partner walked around to help students with calculations and hear the thoughts on the problem they were given. Once finished, the students

came chose one problem from their group that they would be willing to write on the class white board. Each team wrote one problem and with the help of all the other teams the teacher worked through each problem with the class's directions. Once all problems were completed the students were asked to take out a piece of paper while the teacher wrote the problem shown in *Figure 4*. onto the whiteboard. The student the attempted to solve the final problem as their exit ticket for the end of the day.

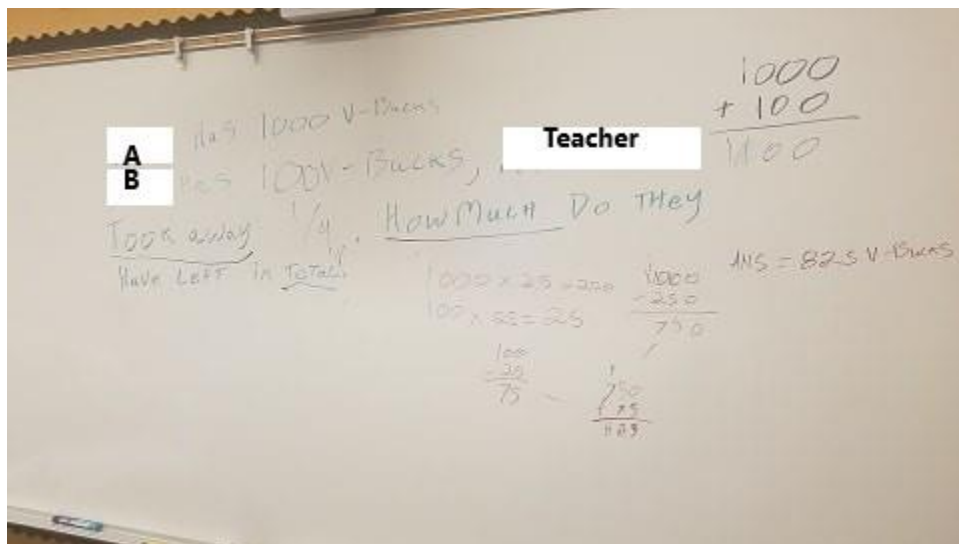


Figure 4. Final Problem of the first lesson, community partner campus, March 7, 2019

The figure was changed post taking to remove any names in the problem. This final word problem uses multiple words that the students had learned as well as uses fractions to build towards a higher level of comprehension. Refer to appendix E for the entire lesson plan laid out in a 5-step format to be used if needed.

Evaluation

The challenges of this project were seen in the areas of time management and class cooperation. The 4th grade class that this experiment took place in had many English Language learners and a fair number of students with learning disabilities that caused reading and writing to be challenging. With the support of the principal giving us an extra hand in class we were able to attend to all the students who were having trouble keeping up but the class being so young made them prone to rambunctious behavior. This behavior caused timing of the initial lesson to be much longer. Lessons following this initial plan were made much faster paced to help keep students on task for the entire lesson. This change to the lesson plan helped keep the timing to fit a micro-teaching strategy and helped the students grasp the concepts easier with the help of their peers instead of asking only for the teacher's input. This helped to fix the main challenges moving forward and helped focus the class into the task at hand.

The success of the project is modeled by *Figure 5*. Which show the data for both Quiz A, the control quiz given at the first-class session, shown here in blue and Quiz B which was given at the end of the project shown in orange. The quizzes were made up of 8 questions the graph shows the scores as fraction and shows 100% ,8/8 as 1. We can see on Quiz A, the "x" in the middle of the graph shows the interquartile range between the lower 3/8 quartile and the higher 6/8 quartile of student scores. This show that the lower scores on Quiz A have driven the median downwards due to many outlier scores that did not fall between the upper and lower quartiles on the first quiz. Quiz B has a similar problem with outliers causing the median to be lower than the interquartile range however we can also see that the upper and lower quartiles have increased in both size and score. This shows an increase in knowledge and content mastery after project completion.

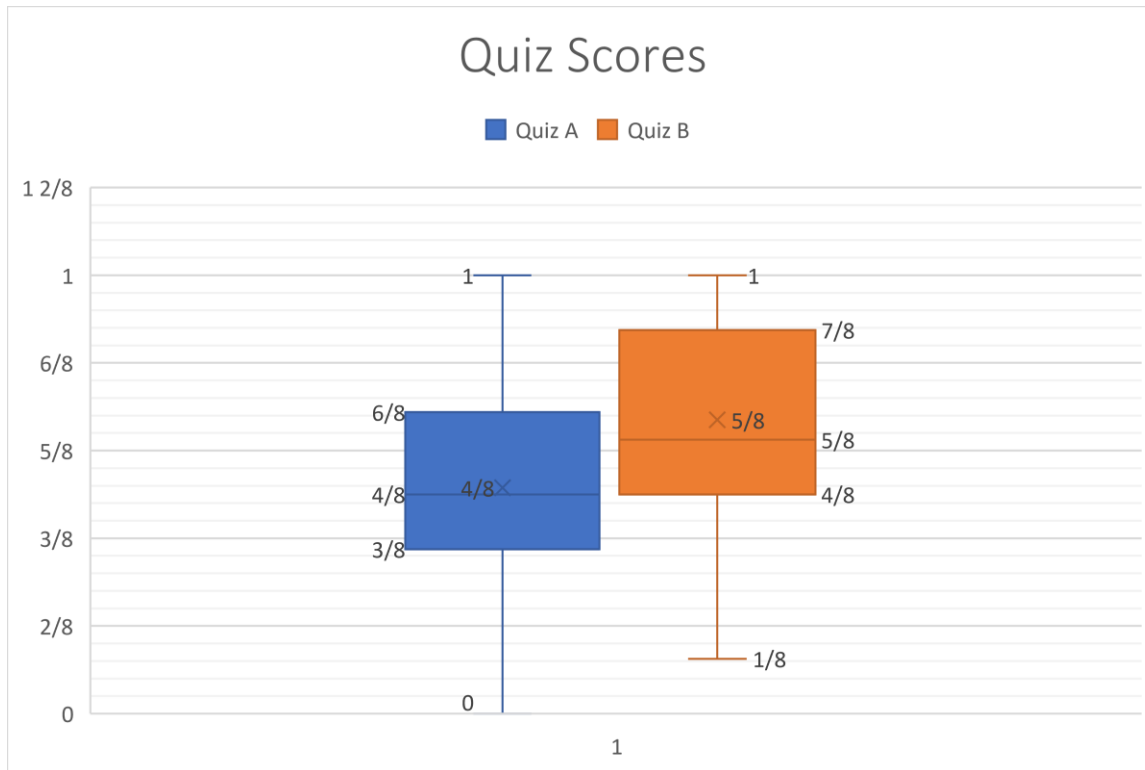


Figure 5. Box and whisker plot showing quiz scores in 8ths.

Reflection

The project consisted of testing the students' knowledge before the teaching commenced and after to see if the students had a better understanding of the content than prior. Figure 5 is used to create an evaluation of the project as well as the successes and challenges that the project yielded. These successes and challenges can come from student performance as well as student involvement that was seen during the curriculum. After the project was completed, recommendations for future usage were discussed. These recommendations should be used as examples of problems that had occurred during the project and not as how the project should be run again.

Discussion

Following the information laid out in the literature review, the project's goal was the increase in content mastery through teaching a 2-week period using micro-lessons. The subject matter taught was created using the California Assessment of Student Performance and Progress (CAASPP) testing standards. The content revisited and built upon allowed for students to increase their knowledge of testable materials prior to the CAASPP tests.

The successes and challenges of this project fell into 2 categories, environmental and curricular. The environmental problems stemmed from multiple factors, for example, the partner's school site was rainy for a week and the students had not been outside for recess for the entire week, this increased their energy levels in the classroom and caused behavioral problems to stand out. Another example was the rules that the community partner had set in their classroom. As this project was done in someone else's classroom and the students had been following a different rule system, the project ran into some trouble when first starting out in ways of time and class management. As the project continued, these classroom management challenges cleared up. The curricular problems of this project connect to the ways it was implemented.

To create micro-lessons in a class that has never heard nor experienced the fast-paced nature of micro-teaching caused a problem in the student's ability to sit quietly for a period of time. The previous classroom rules also stated that the students could get up out of their seat to ring a bell at the front of the class if they needed help. This created a challenge where peer teaching was supposed to be implemented as the students would make a line at the front of the class instead of asking their peers. The next curricular challenge was caused by the scheduling of the CAASPP. The partner site has their testing set for mid-April which is halfway through their school year. This meant that the project would be covering concepts that had not been taught

prior. The curriculum then had to be started at a lower content standard and work up to the required CAASPP testing standard. This led to the final challenge of timing. With the CAASPP testing starting a week after the curriculum ended, the lessons had to be made to accommodate the learning of new standards and working up to content mastery. This caused the micro-lessons to be longer and take more time to complete. The time constraint of micro-lesson plans falls between 20-40 minutes and the lessons ran for nearly 35-40 minute each. The success of the project can be seen in *Figure 5*.

In this figure we see growth between Quiz A, the control given prior to teaching of curriculum, and Quiz B which captured quiz scores after the teaching period was complete. With the increased test scores, it would appear the students retained and increased their content mastery after the micro-lesson curriculum was completed.

Recommendation

The limitation revolving around classroom management presented the biggest challenge to the project. As such, the need to create a classroom that is prepared for micro-lessons curriculum is paramount. This could be done by introducing the curriculum idea and function early in the school year and creating reasonable expectations for the class during the instruction times. The community partner created lessons that required multiple hours to complete, micro-lesson curriculum runs more smoothly when students are attentive and asking questions about the content being lectured. The second recommendation is to include peer to peer teaching into normal curriculum at the beginning of the school year. This teaching method allows students to ask each other questions and builds a learning network, this also takes away from the teacher being called around the classroom for every question. The final recommendation that came out of this project was to do this in a higher-grade level. The 4th grade class that the project was

conducted in may have been too rambunctious due to environmental stimuli. This project may yield more favorable results when conducted in a middle-school classroom.

Future Plans

When creating this project there were two ideas that facilitated the exploration of micro-teaching curriculum. The first ideas focused on the understanding of content retention. How does a student retain the content taught and was a longer lesson that took hours to explain and complete more effective or less effective in creating content mastery? This led down the path of exploring other options of teaching. Using the data and information gathered in the project, this teaching method could be useful to teaching in the future.

The next idea focuses on the influencing of learning behaviors. As students go from grade to grade they are taught the same way. Teachers use curriculum required by the state for long periods of time, the project utilizes a different way of teaching to influence peer-to-peer discussion and exploration of content through questions. As teachers are flooded with questions from students, this increase in peer knowledge pools could help to alleviate the teacher as the primary helper. Using these ideas, the project was created.

Conclusion

This project concentrated on the creation of micro-teaching lesson plans to compact hours of course content into 20 to 40-minute lessons. These lessons focused on lecturing of topics, clarification through examples and a question and monitoring phase. In each phase students participate by listening and formulating questions based on the information presented to them. Next the lesson uses these questions, in peer-to-peer teaching while the teacher monitors the answering of content related questions. From the formulated questions the teacher then discusses

with the whole class the answers to each, helping to build on the content taught. This connection to their peers as not only classmates but also as a knowledge pool helps in creating better questions that can be answered by everyone.

Through the years the curriculum taught by teachers has changed. This change can be related to government acting post the release of “A Nation at Risk” (Gardner & David, 1983). This report became a call to action to create smarter students in the United States education systems and as years go by different offices have offered their changes to that curriculum. For the community partner, their school participated in testing at the beginning of April, causing students to not be up to the end of the year standard. The project used a different teaching method to reiterate past knowledge and build quickly on the content standards required for sufficient scoring on the CAASPP. This project was done in the hope of providing another method to create content mastery outside of normal teaching methodology.

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Appendix A

Word problem word knowledge worksheet

Figure 1.

Word Problem-Word Knowledge
Draw a Line to the meaning of the Word!

Change
Decreased By
Fewer
Difference
Add
Combined
Both
And
Increased by

Cut up
Half
Double
Factor of
Total
Remain
Minus
How many in each
Times

Word Problem-Word Knowledge

Draw a line to the meaning of the Word!



Change

Decreased By

Fewer

Difference

Add

Combined

Both

And

Increased by

Cut up

Half

Double

Factor of

Total

Remain

Minus

How many in each

Times

Appendix B

Student's Word Problems

Figure 2. Community partner campus, March 7, 2019

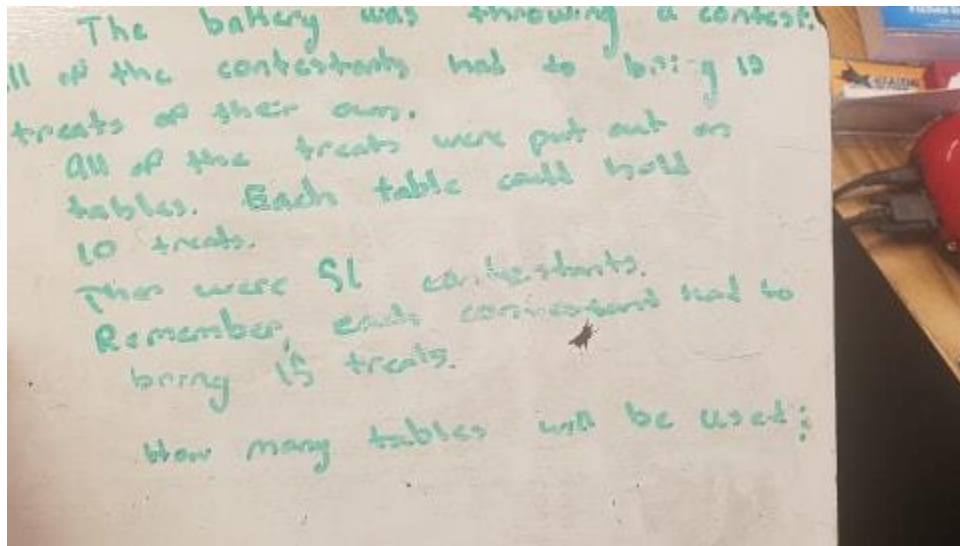
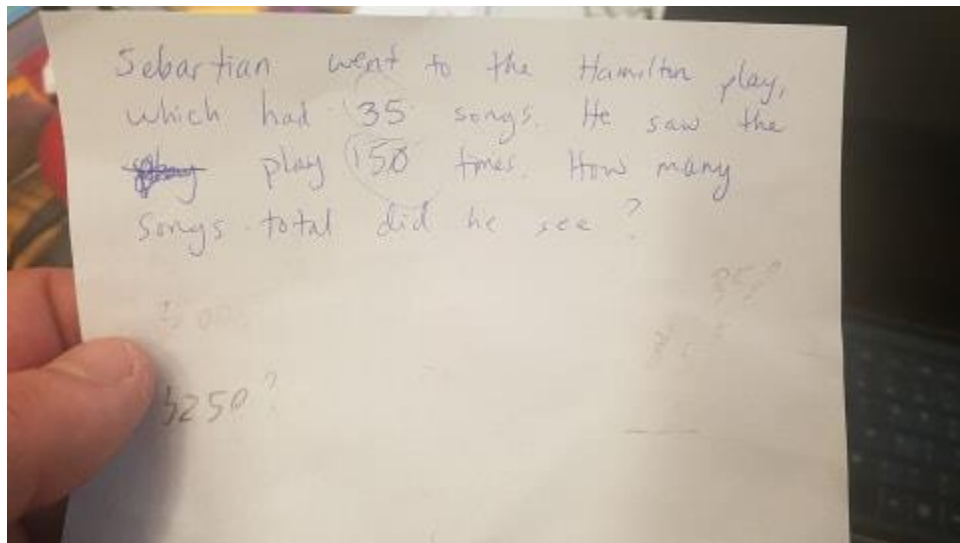


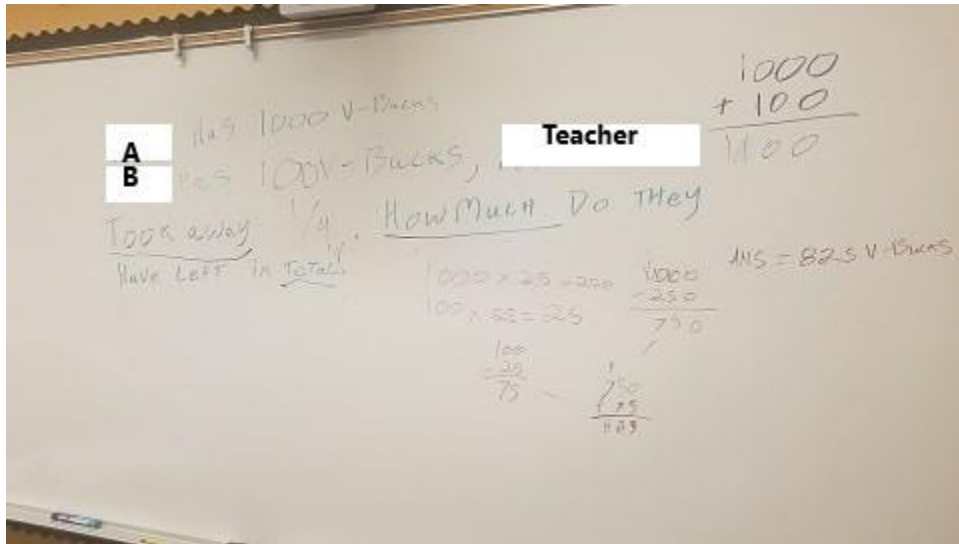
Figure 3. Community partner campus, March 7, 2019



Appendix C

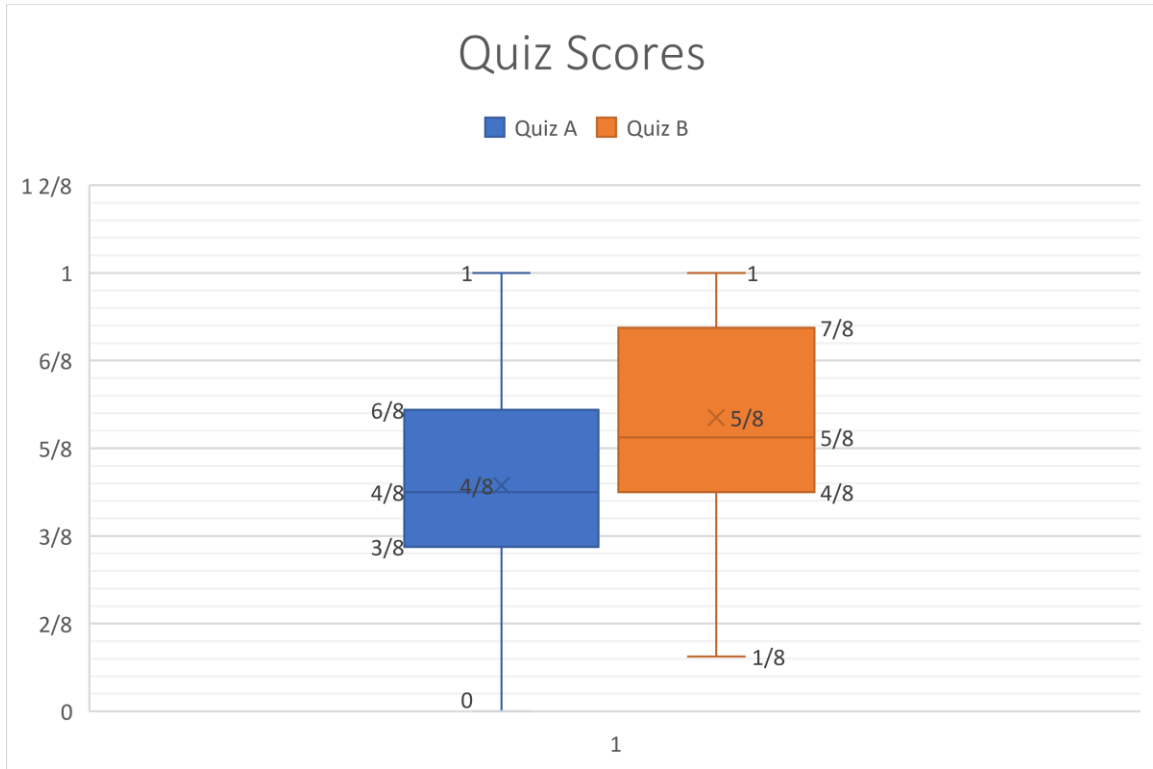
Lesson 1 Final Word problem

Figure 4. Community partner campus, March 7, 2019



Appendix D
CAASPP Practice Quiz

Figure 5.



No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

<p>A baker has 159 cups of brown sugar and 274 cups of white sugar, if the baker's recipe calls for four times the amount of sugar than he has currently, how much sugar does the baker need?</p> <div style="text-align: right; border: 1px solid green; width: 100px; height: 50px; margin-left: auto; margin-top: 20px;"></div>	<p>Lynn is adding $5\frac{3}{5}$ and $8\frac{2}{5}$. She uses these steps to find the sum.</p> <p>Step 1: $5+8=13$</p> <p>Step 2: $\frac{3}{5} + \frac{2}{5} = \frac{5}{10} = \frac{1}{2}$</p> <p>Step 3: $13 + \frac{1}{2} = 13\frac{1}{2}$</p> <p>Lynn made a mistake. Select the statement that corrects the mistake.</p> <ul style="list-style-type: none"> a) In Step 1, $5 + 8$ equals 17 b) In Step 2, She shouldn't have added denominators c) In Step 2, She $\frac{5}{10}$ does not equal $\frac{1}{2}$ d) In Step 3, She should not have added a whole number to a fraction e) Everything is correct
<p>Show the Number line that represents this problem:</p> $\frac{2}{5} + \frac{4}{5} + \frac{1}{5} = 1\frac{2}{5}$ <ul style="list-style-type: none"> a) b) c) d) 	<p>Select the List of numbers that are all multiples of 9.</p> <ul style="list-style-type: none"> a) 9, 27, 35, 63 b) 9, 48, 81, 90 c) 18, 36, 45, 64 d) 18, 54, 72, 99

No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

<p>Simmon has $\frac{1}{4}$ of the Loot Llama's that Ian has. Ian has 30 Loot Llamas.</p> <p>How many Loot Llamas does Simmon have? (Answer may be written as a decimal or fraction)</p> <div data-bbox="625 1003 803 1144" style="border: 1px solid green; width: 110px; height: 67px; margin-left: auto;"></div>	<p>Maya has 24 times as many Tiger Tickets as Daxton, Daxton has 18 less than Alexys.</p> <p>Alexys has 30 Tiger Tickets.</p> <p>How many Tiger Tickets does Maya have?</p> <div data-bbox="1096 1003 1274 1144" style="border: 1px solid green; width: 110px; height: 67px; margin-left: auto;"></div>
<p>True or False</p> <p>67,835 equals:</p> <p>60 thousands + 70 hundreds + 80 tens + 50 ones + 5 tenths</p> <p>a) TRUE</p> <p>b) FALSE</p>	<p>Gregor made some snack mix.</p> <p>He used $\frac{1}{4}$ Cup of M&M's and $\frac{2}{4}$ Cup of nuts to make one serving.</p> <p>Gregor want to make 5 servings of snack mix. How many cups of snack mix are in 5 servings?</p> <div data-bbox="1096 1480 1274 1621" style="border: 1px solid green; width: 110px; height: 67px; margin-left: auto;"></div>

No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

8/8

A baker has 159 cups of brown sugar and 274 cups of white sugar, if the baker's recipe calls for four times the amount of sugar than he has currently, how much sugar does the baker need?

Handwritten calculations:

$$\begin{array}{r} 159 \\ + 274 \\ \hline 433 \end{array}$$

$$\begin{array}{r} 433 \\ \times 4 \\ \hline 1732 \end{array}$$

1732

Lynn is adding $5\frac{3}{5}$ and $8\frac{2}{5}$. She uses these steps to find the sum.

Step 1: $5+8=13$

Step 2: $\frac{3}{5} + \frac{2}{5} = \frac{5}{10} = \frac{1}{2}$

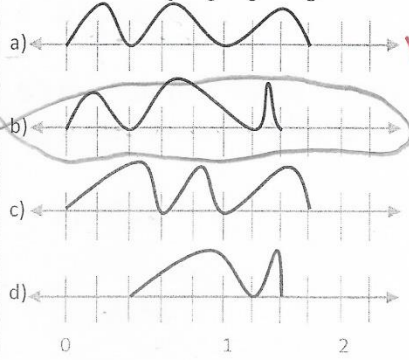
Step 3: $13 + \frac{1}{2} = 13\frac{1}{2}$

Lynn made a mistake. Select the statement that corrects the mistake.

- a) In Step 1, 5 + 8 equals 17
- b) In Step 2, She shouldn't have added denominators
- c) In Step 2, She $\frac{5}{10}$ does not equal $\frac{1}{2}$
- d) In Step 3, She should not have added a whole number to a fraction
- e) Everything is correct

Show the Number line that represents this problem:

$\frac{2}{5} + \frac{4}{5} + \frac{1}{5} = 1\frac{2}{5}$



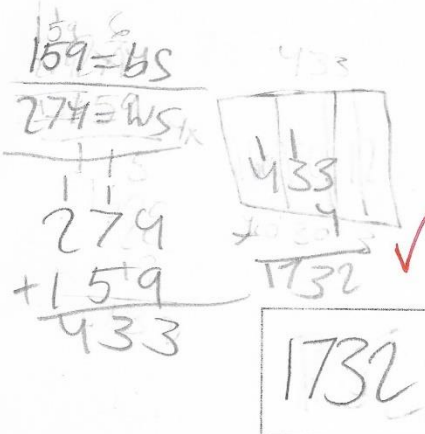
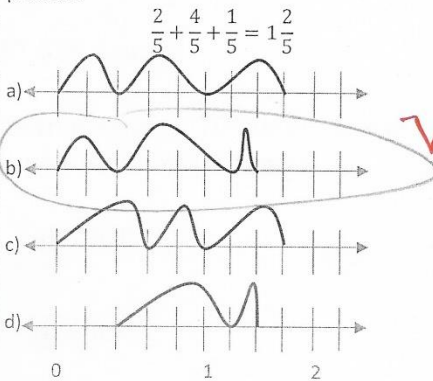
Select the List of numbers that are all multiples of 9.

- a) 9, 27, 35, 63
- b) 9, 48, 81, 90
- c) 18, 36, 45, 64
- d) 18, 54, 72, 99

8/2

No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

<p>A baker has 159 cups of brown sugar and 274 cups of white sugar, if the baker's recipe calls for four times the amount of sugar than he has currently, how much sugar does the baker need?</p> 	<p>Lynn is adding $5\frac{3}{5}$ and $8\frac{2}{5}$. She uses these steps to find the sum.</p> <p>Step 1: $5+8=13$</p> <p>Step 2: $\frac{3}{5} + \frac{2}{5} = \frac{5}{10} = \frac{1}{2}$</p> <p>Step 3: $13 + \frac{1}{2} = 13\frac{1}{2}$</p> <p>Lynn made a mistake. Select the statement that corrects the mistake.</p> <ul style="list-style-type: none"> a) In Step 1, $5 + 8$ equals 17 <input checked="" type="radio"/> b) In Step 2, She shouldn't have added denominators c) In Step 2, She $\frac{5}{10}$ does not equal $\frac{1}{2}$ d) In Step 3, She should not have added a whole number to a fraction e) Everything is correct
<p>Show the Number line that represents this problem:</p> $\frac{2}{5} + \frac{4}{5} + \frac{1}{5} = 1\frac{2}{5}$ 	<p>Select the List of numbers that are all multiples of 9.</p> <ul style="list-style-type: none"> a) 9, 27, 35, 63 b) 9, 48, 81, 90 c) 18, 36, 45, 64 <input checked="" type="radio"/> d) 18, 54, 72, 99

No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

Simmon has $\frac{1}{4}$ of the Loot Llama's that Ian has. Ian has 30 Loot Llamas.

How many Loot Llamas does Simmon have?
(Answer may be written as a decimal or fraction)

$$\begin{array}{r} 7.5 \\ \times 4 \\ \hline 30.0 \end{array}$$

7.5

Maya has 24 times as many Tiger Tickets as Daxton, Daxton has 18 less than Alexys.

Alexys has 30 Tiger Tickets.

How many Tiger Tickets does Maya have?

$$\begin{array}{r} 24 \\ \times 12 \\ \hline 48 \\ 240 \\ \hline 288 \end{array}$$

288

True or False

67,835 equals:

60 thousands + 70 hundreds + 80 tens + 50 ones + 5 tenths

a) TRUE

b) FALSE

Gregor made some snack mix.

He used $\frac{1}{4}$ Cup of M&M's and $\frac{2}{4}$ Cup of nuts to make one serving.

Gregor want to make 5 servings of snack mix. How many cups of snack mix are in 5 servings?

$$\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

$$\frac{3}{4} \times 5 = \frac{15}{4}$$

$3\frac{3}{4}$

No Names Please

Try to solve all Problems and write your answer in the box or Circle the correct answer!

Simmon has $\frac{1}{4}$ of the Loot Llama's that Ian has. Ian has 30 Loot Llamas.

How many Loot Llamas does Simmon have?
(Answer may be written as a decimal or fraction)

$$1/4 \cdot 30 = 7.5$$

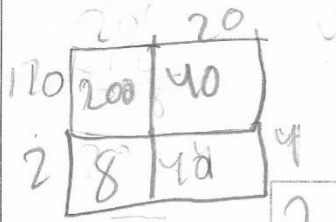
7.5

Maya has 24 times as many Tiger Tickets as Daxton, Daxton has 18 less than Alexys.

Alexys has 30 Tiger Tickets.

How many Tiger Tickets does Maya have?

$$\begin{aligned} \text{Daxton} &= 12 \\ \text{Lexy} &= 30 \\ \text{Maya} &= ? \end{aligned} \quad \begin{array}{r} 280 \\ - 18 \\ \hline 12 \end{array}$$



288

True or False

67,835 equals:

60 thousands + 70 hundreds + 80 tens + 50 ones + 5 tenths

a) TRUE

FALSE

Gregor made some snack mix.

He used $\frac{1}{4}$ Cup of M&M's and $\frac{2}{4}$ Cup of nuts to make one serving.

Gregor want to make 5 servings of snack mix. How many cups of snack mix are in 5 servings?

$$\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

$\frac{15}{4}$

Appendix E

Word Problem Lesson Plan

Lesson Plan Template

NAME:	SUBJECT: Word Problems
SCHOOL: N/A	GRADE LEVEL: 4
Class Description:	

Formal/Informal Assessment of Prior Learning or Pre-assessment	<p>Teacher does:</p> <p>Pass out matching puzzle to recap words used in Mathematical Language.</p> <p>Write the same handout on the board. As for Hands to help solve the puzzle.</p>	<p>Students do:</p> <p>Raise hands and point out which symbol means what (And means plus....etc)</p>
<p>Standards:</p> <ul style="list-style-type: none"> • Content 	<p><u>Mathematic Practice</u></p> <ul style="list-style-type: none"> • 4.OA.3 Solving multistep word problems posed with whole numbers using the four operations. 	
Central Focus/Learning Target	Word Problem Language understanding and usage in personal context.	
Lesson Learning Target (LT)/Student Outcomes/Objectives	Students will be able to create and solve word problems by understanding mathematical language.	
Academic Language	<p>Addition:</p> <ul style="list-style-type: none"> • Add • All Together • And • Both • Combined <p>Subtract</p>	

	<ul style="list-style-type: none"> • Change • Decrease by • Difference • Fewer than • Take away <p>Multiplication</p> <ul style="list-style-type: none"> • By • Double • Increase by • Factor of • Product <p>Division</p> <ul style="list-style-type: none"> • As Much • Cut up • Equal sharing • Percent • Quotient 	
<p>Materials</p>	<ul style="list-style-type: none"> • White Boards • Dry Erase Markers • Scratch Paper • Pencils/pens • Sticky Notes 	
<p>Instruction (Identify necessary supports/scaffolding/modifications)</p> <p><i>[Time Allotted: __8_]</i></p>	<p>Teacher does:</p> <p>Give numbered sticky notes to create groups. Either based on color or a number written on the post it.</p> <p>Ask Each student to write a word problem about their friend/group member on their white board using the learned Language. Must have at least 2 numbers and a goal in mind.</p>	<p>Students do:</p> <p>Students group up, get broken up, then start to write a small word problem</p>
<p>Formative (Informal) Assessment</p> <p><i>[Time Allotted: _2_]</i></p>	<p>Teacher does:</p> <p>Walk the classroom and check on the progression while helping students as needed.</p>	<p>Students do:</p> <p>Work on creating problems for their peers to solve.</p>

<p>Instruction and/or Practice Activity (as determined by Formative Assessment)</p> <p>(Identify necessary supports/scaffolding/modifications)</p> <p><i>[Time Allotted: _8-10_]</i></p>	<p>Teacher does:</p> <p>Everyone in the groups switch boards with a neighbor/group member, each student must solve the other's problem.</p>	<p>Students do:</p> <p>Attempt to pick out language used and craft a mathematical formula to solve the problem. Scratch paper may be used.</p>
<p>Formative (Informal) Assessment</p> <p><i>[Time Allotted: _2_]</i></p>	<p>Teacher does:</p> <p>Assess the methods the students are using to solve the problems and which model they are implementing to solve the equation.</p>	<p>Students do:</p> <p>Work on problem, Raise hands for questions</p>
<p>Instruction and/or Practice Activity (if needed)</p> <p>(Identify necessary supports/scaffolding/modifications)</p> <p><i>[Time Allotted: _10_]</i></p>	<p>Teacher does:</p> <p>Each group chooses one-word problem that they enjoy from their peers and explain it to the teacher.</p> <p>Re-write their problem on the board and ask the class's help in solving the problem. Make sure to call on quiet hands and allow for sufficient timing for the students to think.</p>	<p>Students do:</p> <p>Raise hands and Help the teacher solve their group's problems.</p>
<p>Closure with Outcomes Assessment</p> <p><i>[Time Allotted: _10_]</i></p>	<p>Teacher does:</p> <p>Puts up one last problem on the board.</p> <p>(Student A has 1000(things), Student B has 100(things), Teacher took away 1/4 of both student's things. How many (things) do both Student A and Student B have together now. ANS=825</p>	<p>Students do:</p> <p>Teach the Teacher through raised hands how to solve the problem.</p>

Appendix F

Fractions Word Problem Lesson Plan

Lesson Plan Template

NAME: Problems	SUBJECT: Fraction Word
SCHOOL:	GRADE LEVEL: 4th
Class Description:	

Formal/Informal Assessment of Prior Learning or Pre-assessment	Teacher does: By this point the teacher has given the students the control/prior knowledge quiz to find the points in which the students need more help. Using this quiz create a simple word problem with fractions such as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$...etc. to help warm up the minds. Ask the students to create a math equation using the word problem and walk around the room to help anyone who is stuck.	Students do: Create mathematical formula using the word problem as guidelines. Raise hands if help is needed.
Standards: <ul style="list-style-type: none">• Content	• 4.NF.4c Solve word problems involving multiplication of fractions by a whole number.	
Central Focus/Learning Target	Creating an equation using a word problem, then creating another word problem form a pre-determined formula.	
Lesson Learning Target (LT)/Student Outcomes/Objectives	Students will use mathematical language queues to create and solve equations	
Academic Language	Addition:	

<ul style="list-style-type: none"> • Demands • Functions • Forms 	<ul style="list-style-type: none"> • Add • All Together • And • Both • Combined <p>Subtract</p> <ul style="list-style-type: none"> • Change • Decrease by • Difference • Fewer than • Take away <p>Multiplication</p> <ul style="list-style-type: none"> • By • Double • Increase by • Factor of • Product <p>Division</p> <ul style="list-style-type: none"> • As Much • Cut up • Equal sharing • Percent • Quotient 	
<p>Materials</p>	<ul style="list-style-type: none"> • Scratch paper • Pencil/Pen 	
<p>Instruction</p> <p>(Identify necessary supports/scaffolding/modifications)</p> <p><i>[Time Allotted: __3__]</i></p>	<p>Teacher does:</p> <p>Remind the students to raise their hands for questions, calling out will not be answered.</p> <p>Start on the problem by asking their thoughts on the equations they created. (Use random numbers or names as need be to ask other students)</p> <p>Write the equations they created on the board and solve them with the class. If the equation is wrong as</p>	<p>Students do:</p> <p>Explain, using mathematical language the equation that they created and help the teacher solve it.</p>

	for another student's thoughts. If it is right, continue to a harder problem.	
Formative (Informal) Assessment <i>[Time Allotted: __5__]</i>	<p>Teacher does:</p> <p>If all students agree about the correct answer, continue the lesson. If any student seems to be struggling, as for their input to work on the lesson.</p> <p>If the students have the incorrect answer, ask them how they came to that answer or revisit the academic language they learned in the first lesson.</p>	<p>Students do:</p> <p>Come to a consensus, right or wrong about the answer to the problem and how to solve it.</p>
Instruction and/or Practice Activity (as determined by Formative Assessment) (Identify necessary supports/scaffolding/modifications) <i>[Time Allotted: __3__]</i>	<p>Teacher does:</p> <p>Increase difficulty of problem and repeat.</p> <p>(if you are having trouble creating a problem, refer to the pre-test to create a fraction word problem, ask students to show a number line of the answer)</p> <p>When failure or success occurs try to not give away any "tells" so the students will hopefully recheck their work and find a definitive answer.</p> <p>Ask students to share their answers to their neighbor to check that both have the correct answer.</p>	<p>Students do:</p> <p>Work to explain and create a mathematical equation.</p>
Formative (Informal) Assessment <i>[Time Allotted: __5__]</i>	<p>Teacher does:</p> <p>Walks around the room and surveys for understanding. Pick 2 groups that have differing ways of creating the answer and ask if they would write it on the board.</p>	<p>Students do:</p> <p>Discuss the answer and write it on the board if called upon.</p>

<p>Instruction and/or Practice Activity (if needed)</p> <p>(Identify necessary supports/scaffolding/modifications)</p> <p><i>[Time Allotted: _6_] </i></p>	<p>Teacher does:</p> <p>Using the pre-test create an extremely challenging problem that uses mixed fractions and asks for a decimal answer.</p> <p>(example: $\frac{3}{4} \times \frac{6}{4} = ?$ As a decimal but built into a word problem)</p> <p>Continue to walk and ask groups to share on the white board asking 3 different groups this time and continue to ask for a number line of the answer.</p>	<p>Students do:</p> <p>Work separately until told otherwise</p> <p>Then together with a neighbor to find the correct answer to write (if asked) on the white board.</p>
<p>Closure with Outcomes Assessment</p> <p><i>[Time Allotted: _6_] </i></p>	<p>Teacher does:</p> <p>Create an equation</p> <p>Show it on number line</p> <p>Ask students to create a word problem that goes with this answer.</p>	<p>Students do:</p> <p>Create a word problem using equation and number line that matches the answer.</p>